BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Investigation pursuant to Senate Bill 380 to determine the feasibility of minimizing or eliminating the use of the Aliso Canyon natural gas storage facility located in the County of Los Angeles while still maintaining energy and electric reliability for the region.	Investigation 17-02-002

OPENING COMMENTS OF THE COALITION OF CALIFORNIA UTILITY EMPLOYEES ON ENERGY DIVISION'S FINAL PHASE 1 SCENARIOS FRAMEWORK

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Marc D. Joseph
Rachael E. Koss
Adams Broadwell Joseph & Cardozo
601 Gateway Blvd., Suite 1000
South San Francisco, CA 94080
(650) 589-1660 Telephone
(650) 589-5062 Fax
mdjoseph@adamsbroadwell.com
rkoss@adamsbroadwell.com

Attorneys for the Coalition of California Utility Employees

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Pursuant to the September 14, 2018 Administrative Law Judge's Ruling Entering Into Record Energy Division's Final Phase 1 Scenarios Framework, Requesting Comment and Setting Procedure to Request Phase 1 Evidentiary Hearings, the Coalition of California Utility Employees submits these comments on the Energy Division's Final Phase 1 Scenarios Framework. These comments were prepared with the technical assistance of Dr. Robert Earle. Dr. Earle is an economist with extensive experience in the energy sector, including valuation, environmental mitigation methods and costs and regulatory economics. Dr. Earle's areas of expertise include electric power sector modeling, economics of environmental mitigation, electric power and gas markets, regulatory policy and ratemaking, demand response and system optimization.

I. INTRODUCTION

CUE has four areas of concern about the Scenarios Framework. First, the scenarios appear to be limited in some aspects to only mild conditions. As a result, the analysis likely does not address the full extent of impacts from Aliso Canyon curtailment or shutdown. Second, the scenarios should explicitly address the need for power plants to be scheduled well in advance.

Third, the Production Cost Model (PCM) scenarios should be revised to include (1) realistic scenarios that stress the system, (2) region-wide modeling, (3) power flow modeling through CAISO's top-down approach (in addition to the bottom-up approach adopted), and (4) a more granular analysis. Finally, the economic analyses have a number of issues as detailed below, but broadly speaking it is unclear how the economic analyses actually answer the question of "how reducing or eliminating use of Aliso would impact gas and electric reliability, electric costs and reliability, and natural gas commodity costs."[1]

II. SOME SCENARIOS USE ONLY MILD CONDITIONS AND DO NOT ADDRESS THE FULL EXTENT OF IMPACTS

A major concern about the scenarios presented in the Scenarios Framework is that in some aspects they seem to model only relatively mild conditions. If the models are "intended to estimate how reducing or eliminating use of Aliso would impact gas and electric reliability, electric costs and reliability, and natural gas commodity costs,"[2] then it is necessary to include situations that are both mild and those that stress the system more severely.

For example, CPUC staff intends to model only one pipeline outage[3] even though, as CAISO has pointed out, "there are currently multiple main gas transmission outages that affect gas delivery into the southern California area."[4] As a result, the CPUC pipeline outage scenario will not even address the severity of current ***actual*** conditions, much less "stress test" the system.

Moreover, with respect to the one outage that the Scenarios Framework does address, it appears that it is an outage that has historically occurred with a frequency of more than 10%.[5]

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[1] Scenarios Framework, p. 5.
[2] Ibid.
[3] Ibid, p. 45.
[4] CAISO Comments, p. 2.
[5] Scenarios Framework, p. 18. 10% frequency or more for the 1-in-10 reliability standard and 3% frequency or more for the 1-in-35 standard.

Outages that have occurred with a frequency of less than 10% will not be addressed, regardless of their severity. Therefore, the scenarios would not even evaluate the system under conditions that are as severe as have, in fact, occurred.

The Scenarios Framework provides that, "[a] key assumption of the analysis framed here is that the stressed conditions imposed in the Reliability Assessment are infrequent or that they are, on average, balanced out by **abnormally mild system conditions**, and do not significantly impact the total storage volumes over a several-month time frame."[6] The Scenarios Framework does not define "abnormally mild," and, more importantly, it does not appear that the "stressed conditions" in the Reliability Assessment are actually all that infrequent. Therefore, the "stressed conditions" should be included in the Scenarios Framework.

With respect to the PCM, it appears that there are two scenarios. The first scenario is the "Unconstrained Gas" scenario in which no constraints are put on gas supply to plants and plants are able to operate according to their technical parameters (such as startup and ramp rate). The second scenario, "Minimum Local Generation," has forced curtailment of generation. In this scenario, electric generators are curtailed except for only the minimum amount of generation dictated as necessary by the Power Flow Analysis.[7] The PCM analysis is insufficient because it fails to include realistic scenarios that examine the impact of electric power transmission outages or deratings, natural gas plant outages or deratings, or high demand on natural gas power plants because of low wind or solar production. Each of these scenarios can stress the electric power system with consequent impacts on reliability and costs.

[6] Scenarios Framework, p. 20 (emphasis added).
[7] Ibid, p. 25.

The Scenarios Framework should be revised to include conditions such as the ones discussed above in order to realistically assess the impact of curtailment or closure of Aliso Canyon.

III. PROPOSED MODELING OF IMPACTS FROM THE NEED FOR POWER PLANTS TO BE SCHEDULED IN ADVANCE NEEDS CLARIFICATION

The Scenarios Framework states that if Aliso Canyon is closed, "power plants in Southern California will need to be scheduled **well in advance**, to allow for delivery from a distant gas delivery hub and to prevent imbalances that were previously mitigated with storage."[8] This could be a very significant negative impact in a number of ways, including that gas-fired power plants might be limited in their ability to provide ancillary services and power in real time. "Well in advance" is not quantified, nor is this issue discussed elsewhere in the Scenarios Framework. CPUC Staff propose to model this by changing the ramp rate and increasing startup time for affected plants in the PCM. To determine whether Staff's model will sufficiently assess impacts from the need for power plants to be scheduled in advance, Staff must define "well in advance" and explain what changes to power plant ramp rates and startup times they propose.

In addition, it is unclear whether Staff's proposed hydraulic modeling accounts for the need to schedule power plants well in advance. What happens if, for instance, plants schedule gas delivery in advance, but then do not take delivery because they do not run (for either economics or reliability)? Staff should specify how the Scenarios Framework modeling analyzes the full scope of impacts from the need to schedule power plants well in advance.

IV. THE PRODUCTION COST MODEL SCENARIOS ARE INSUFFICIENT

There are several areas in which the PCM scenarios are insufficient and must be broadened to fully assess the impacts from curtailment or shutdown of Aliso Canyon.

[8] Ibid, p. 30 (emphasis added).

First, as discussed above, the PCM should include realistic situations such as electric power transmission outages or deratings, natural gas plant outages or deratings, and high demand on natural gas power plants because of low wind or solar production. Each of these could stress the electric power system with consequent impacts on reliability and costs. By failing to include these situations in the modeling, the modeling cannot fully assess potential reliability and cost impacts from Aliso Canyon curtailment or closure.

Second, the Scenarios Framework should adhere to CAISO's suggestion to use both a bottom-up and top-down approach to incorporate "power flow modeling to inform both the hydraulic and production cost modeling."[9] The "top-down" approach uses production cost and hydraulic modeling from the Commission to determine the amount of gas available for electric generation. CAISO can then examine whether there is sufficient gas to meet minimum generation requirements in a power flow study. The "bottom-up" approach provides minimum gas generation requirements from the power flow model to the PCM.[10] The Scenarios Framework includes the bottom-up approach, but not the top-down approach. As a result, valuable insights from the top-down approach will be lost because the top-down approach makes better use of the power flow model to determine the adequacy of gas resources to meet minimum generation requirements.

Third, the Scenarios Framework should include western region impacts, as CAISO suggested.[11] A recent WECC Study found that the retirement of Aliso Canyon creates region-wide reliability concerns.[12] The WECC Study states that "prior to the 2015 gas leak, the 86 bcf

[9] CAISO Comments, p. 1.
[10] Ibid, p. 3.
[11] CAISO Comments, p. 3.
[12] "Western Interconnect Gas – Electric Interface Study", 2018, (henceforth, "WECC Study") available at https://www.wecc.biz/Administrative/WECC Gas Study Public Presentation.pdf

of market-area gas storage available at Aliso Canyon played a key role in managing system volatility and reliability."[13] With a limited Aliso Canyon, the WECC Study says that the "system has experienced multiple close calls and near misses" such as "[u]nplanned SoCalGas pipe outages in Oct-Dec 2017 caused local gas prices to spike >$12/mmbtu" and "[f] reeze-offs in winter 2018 brought a major pipeline to the brink of gas curtailments."[14] The WECC Study concludes that the:

> configuration of the gas/electric system combined with the loss of Aliso Canyon creates region-wide reliability issues. Modelling scenarios have identified DSW and Southern California in particular as reliability risks, with the DSW pipe disruption and freeze-off scenarios resulting in unserved energy and unmet spinning reserves. The results translate into risked **economic impacts on the order of several hundred million to a billion dollars**.[15]

The Scenarios Framework cannot ignore these significant reliability and cost impacts.

Finally, the CPM must include more granular analysis, especially given the need for gas-fired power plants to schedule deliveries well in advance, as discussed above. As CAISO explains:[16]

> Local electric generation needs are determined based on power flow modeling analysis that considers the impact of specified transmission or generation contingency events. To determine whether the local area can adequately withstand such contingency events, local generation must respond within thirty minutes after the studied contingency. Local gas-fired generation may be dispatched to quickly ramp up generation to address the contingency. The proposed hydraulic and production cost modeling will provide hourly granularity, which may miss potential ramping issues that occur on a post-electric contingency basis. To accurately capture post-contingency ramping needs, the Commission should conduct more granular analysis in its hydraulic and production cost modeling. The CAISO recommends conducting these analyses with thirty minute step sizes (rather than hourly), at the maximum.

[13] WECC Study, p. 3.
[14] Ibid, p. 20.
[15] Ibid, p. 21 (emphasis added).
[16] CAISO Comments, p. 4.

To accurately and fully assess impacts from curtailing or closing Aliso Canyon, the CPM must be revised.

V. THE ECONOMIC MODELING IS INSUFFICIENT

The Scenarios Framework proposes three economic models all having "statistical and/or econometric" approaches. The economic modeling depends on historical data rather than bottom up modeling. As a result, if conditions depart from those that have been seen historically, it will be difficult to apply the results to new conditions. In other words, a model that fits historical data well, will not necessarily extrapolate to new conditions. As a result, the usefulness of the proposed economic modeling to analyze the permanent curtailment or shutdown of Aliso Canyon, scenarios which have never before occurred, is questionable. Moreover, none of the three proposed study areas clearly state how the analyses would actually show the impacts of Aliso Canyon curtailment or shutdown. While they are all potentially interesting analyses, and perhaps ones that should (with some modifications) be performed, at this point they are more exploratory in nature and cannot, by themselves, address the central issue of this proceeding.

A. The Volatility Analysis is Insufficient

The Volatility Analysis proposed in the Scenarios Framework "estimate[s] and predict[s] the impacts of natural gas price volatility on core natural gas customers."[17] The Scenarios Framework points out that there are several ways storage can help reduce the impact of fluctuations in natural gas prices:

- Seasonally, by purchasing and storing gas "in the off-season, when prices are generally lower, for use in the summer and winter, when demand and prices tend to be higher;"
- Moderating costs during temporary price spikes; and

[17] Scenarios Framework, p. 31.

- Mitigating "imbalances and penalties related to imbalances during operational flow orders (OFOs)."[18]

The Scenarios Framework appears to use daily variations in calculating volatility for SoCalGas Citygate and some other markets.[19] The next step under the Scenarios Framework is:

> Once the volatility is computed, if more variation is observed in the SoCalGas Citygate price compared to other markets, CPUC staff will perform a time series model with explanatory variables to study the relationship between the daily price return of the SoCalGas Citygate natural gas pricing hub and explanatory variables. [20]

It is not clear that this analysis, by itself, addresses the question of "how reducing or eliminating use of Aliso would impact gas and electric reliability, electric costs and reliability, and natural gas commodity costs."

For example, what is the conclusion if less variation is observed in the SoCalGas Citygate price compared to other markets? Apparently, the analysis stops at that point. Is the conclusion that core natural gas customers are not impacted by volatility? How does the comparison of ***daily*** volatilities address the "traditional role" of Aliso Canyon to guard against ***seasonal*** price swings? Finally, how does the comparison of volatilities address "how reducing or eliminating use of Aliso would impact gas and electric reliability, electric costs and reliability, and natural gas commodity costs?" It may be that the answers to these questions are obvious and readily addressable, but the Scenarios Framework should spell out what the answers are.

If there is more variation in the SoCalGas Citygate price compared to other markets and an econometric analysis using GARCH, or a similar analysis to "study the relationship between the ***daily price return*** of the SoCalGas Citygate natural gas pricing hub and explanatory variables," similar questions apply. How does the relationship of ***daily*** price return and

[18] Ibid, p. 32.
[19] Ibid, p. 33.
[20] Ibid.

explanatory variables address the value of Aliso Canyon in mitigating ***seasonal*** storage? What is the hypothesis that the GARCH or similar analysis is testing?[21] Given some conclusion from the hypothesis tested by the GARCH analysis, how will this be applied to the question of the value of Aliso Canyon in reducing seasonal price variation, reducing price spikes, and reducing imbalance penalties.?

As it stands, the proposed volatility analysis appears to be insufficient to determine the impacts from the curtailment or shutdown of Aliso Canyon.

B. The Analysis of the Impact of Natural Gas Storage on Ratepayers' Bills is Insufficient

According to the Scenarios Framework, the Impact of Natural Gas Storage on Ratepayers' Bills analysis "will quantify and compare the impacts of gas storage availability on ratepayer costs for core customers in similarly situated geographic areas."[22] The Bills Analysis relies on looking at bills before and after the curtailment of the Aliso Canyon storage facility through an econometric model by comparing SoCalGas customers with PG&E customers.[23]

As noted above, the time frame for the data is limited and even if it can show differences in customer bills for the curtailment period and after, it is not clear it can account for future circumstances. Moreover, as with the Volatility Analysis, the Bills Analysis does not explicitly state what conclusions will be drawn depending on the results. It would be helpful for the Scenarios Framework to explicitly state what hypotheses are being tested and how those apply to answering the question of "how reducing or eliminating use of Aliso would impact gas and electric reliability, electric costs and reliability, and natural gas commodity costs."

[21] Depending on the hypothesis that is being tested, doing the GARCH or similar analysis on other markets may be warranted.
[22] Scenarios Framework, p. 31.
[23] Ibid, p. 36.

The proposed Bill Analysis is also insufficient because it ignores potentially confounding effects, variables that explain the difference or lack of difference in the bill data. For example, it appears that the Bill Analysis does not account for the underlying PG&E variables, such as PG&E Citygate prices, management of storage system and other variables particular to PG&E.

C. Impact of Tighter Gas Supply in SoCalGas System on Power Generation in CAISO Territory

The Scenarios Framework Impact of Tighter Gas Supply comprises two analyses. The first, the Implied Market Heat Rate analysis, compares Northern and Southern California implied market heat rates.[24] While this is an interesting analysis, the Scenario Framework does not state what conclusions should be drawn from this analysis depending on its results. It is not clear what can be concluded from comparing historical market heat rates without taking into account differing factors in each region such as load, generation mix available (including imports), weather, outages, demand-side measures and gas prices. The analysis fails to account for the need to run gas-fired power plants for reliability reasons only. So, how does this analysis answer the question of "how reducing or eliminating use of Aliso would impact gas and electric reliability, electric costs and reliability, and natural gas commodity costs?" It does not.

The second analysis, Congestion Rent Assessment, looks at congestion rents between Northern and Southern California during the period 2015 to 2018.[25] In addition, the Scenarios Framework proposes a "correlation analysis between the daily natural gas price difference between SoCalGas Citygate price and PG&E Citygate Price, the daily available operating capacity as a proxy for pipeline outages, and the daily congestion rent revenue component of energy prices in Southern California and Northern California."[26] While interesting as exploratory

[24] Scenarios Framework, p. 40.
[25] Ibid, p. 41.
[26] Ibid, p. 42.

analyses, it is unclear what conclusions can be drawn from the results of these analyses that would go to answer the question of "how reducing or eliminating use of Aliso would impact gas and electric reliability, electric costs and reliability, and natural gas commodity costs."

VI. CONCLUSION

To accurately and adequately assess the impacts of curtailing or shutting down Aliso Canyon, the Scenarios Framework must be revised. The scenarios must be expanded to consider more than just mild conditions. The scenarios should explicitly address the need for power plants to be scheduled well in advance. The PCM scenarios should be revised to include realistic scenarios that stress the system, region-wide modeling, power flow modeling through CAISO's top-down approach, and a more granular analysis. Finally, the economic analyses must be revised to target the question of "how reducing or eliminating use of Aliso would impact gas and electric reliability, electric costs and reliability, and natural gas commodity costs."[27]

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Respectfully submitted,

/s/

Marc D. Joseph
Rachael E. Koss
Adams Broadwell Joseph & Cardozo
601 Gateway Blvd., Suite 1000
South San Francisco, CA 94080
(650) 589-1660 Voice
(650) 589-5062 Fax
mdjoseph@adamsbroadwell.com
rkoss@adamsbroadwell.com

Attorneys for Coalition of California Utility Employees

[27] Ibid, p. 5.